

The Transportation Corridor Agencies Present

# FOSSILS IN YOUR BACKYARD

Welcome to Prehistoric Orange County



Sponsored by: LSA Associates, Inc. and the Transportation Corridor Agencies/The Toll Roads

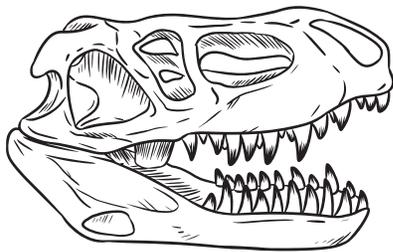
# What are Fossils? What is Paleontology?

The only direct way we have for learning about dinosaurs and other ancient animals is by studying fossils. Fossils are the remains of ancient animals and plants, the traces or impressions of living things from past geologic ages, or the traces of their activities.

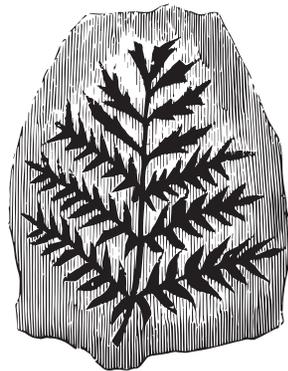
Fossils have been found on every continent on earth, maybe even near where you live.

The word “fossil” comes from the Latin word “fossilis,” which means “dug up.” Most fossils are excavated from sedimentary rock layers. Sedimentary rock is rock that has formed from sediment, like sand, mud and small pieces of rock. Over long periods of time, these small pieces of debris are compressed (squeezed) as they are buried under more and more layers of sediment that piles up on top of it. Eventually, they are compressed into sedimentary rock. The layers that are farther down in the earth are older than the top layers.

Paleontology is the branch of biology and geology that studies the forms of life that existed in former geologic periods, mainly by studying fossils.



*Skull*



*Fossilized Plant*



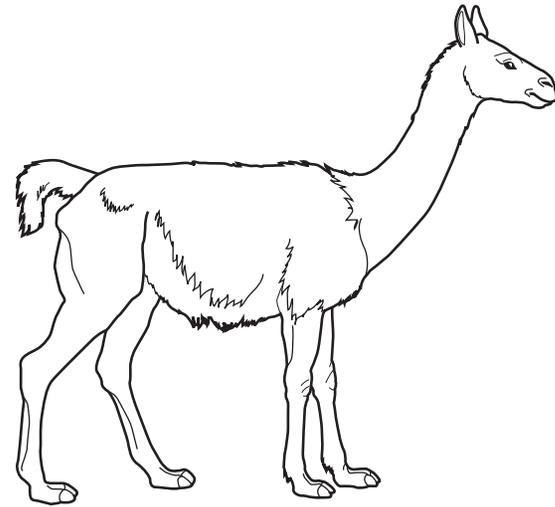
*Seashell*

# Orange County: One Million Years Ago

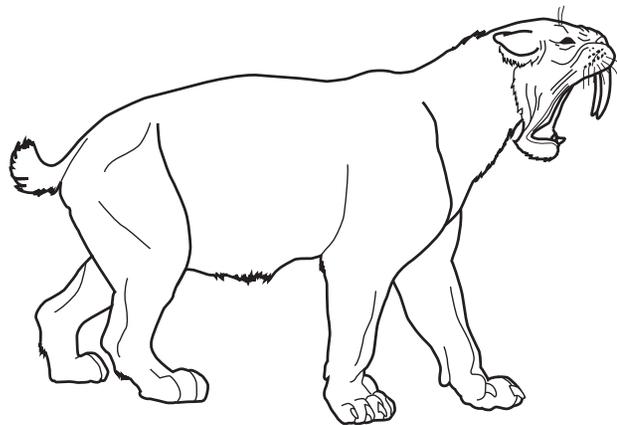
Imagine you lived here one million years ago. At that time, the land would not have looked much different than it does today. But many different animals lived in the Orange County area. Giant Ground Sloths, Llamas and Tapirs fed on the plants of the county, while Saber Tooth Cats hunted these large plant eaters. Based on the archaeological record, humans first moved into Orange County about 10,000 years ago.



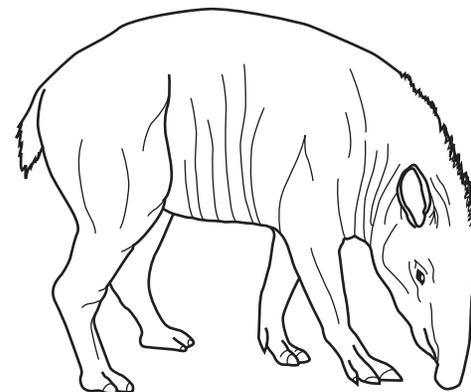
*Giant Ground Sloth*



*Llama*



*Saber Tooth Cat*



*Tapir*

# Prehistoric Animals of Orange County

Thousands of bones and other fossils have been recovered when roads, homes and other construction projects were built. Here's a list of some of the fossils found when The Toll Roads were built:

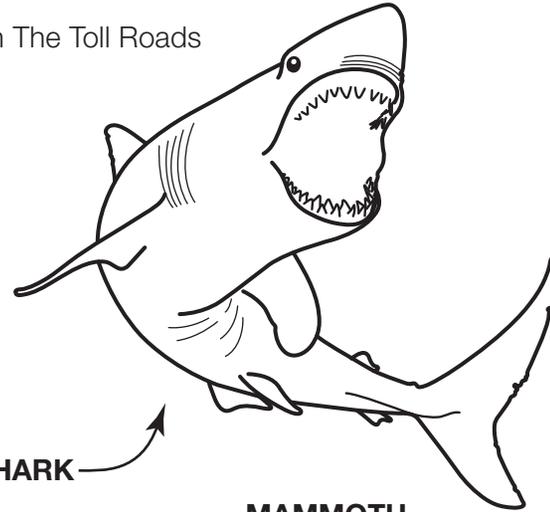


## **BALEEN WHALE**

Size: 35-80 feet long

Fossils found: Skull, jaws and several complete skeletons

Age of find: 10 to 12 million years old



## **GIANT GREAT WHITE SHARK**

Size: Up to 42 feet long

Fossils found: Large teeth

Age of find: 5 to 20 million years old

## **MAMMOTH**

Size: 12-13 feet at the shoulders

Fossils found: Tusks, teeth, thighbone, vertebra and ribs

Age of find: Over 10,000 years old

## **DESMOSTYLUS** (Marine hippo-like animal)

Size: 7-10 feet long, 3 tons

Fossils found: Skeleton, skull, jaws and teeth

Age of find: 28 to 10 million years old

## **BLACK BEAR**

Size: 6-7 feet, 300-600 pounds

Fossils found: Skull

Age of find: Over 10,000 years old

## **DUCK-BILLED DINOSAUR**

Size: 10-15 feet tall; 3-4 tons

Fossils found: Neck vertebra and toe bone

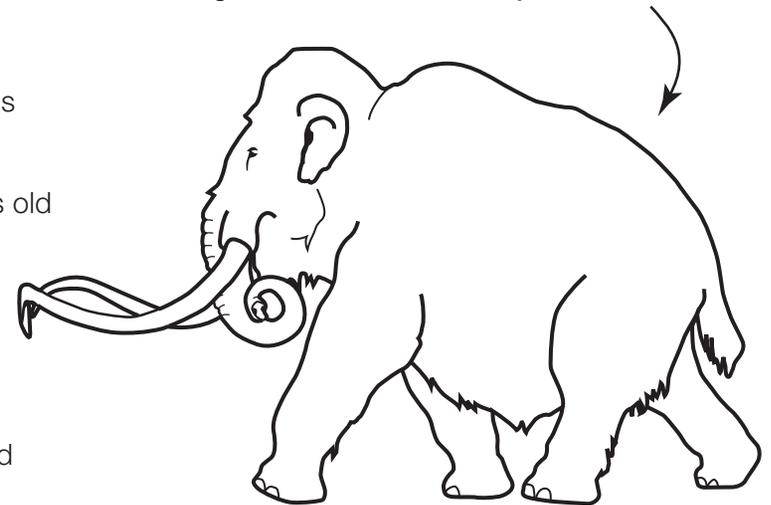
Age of find: 70 to 75 million years old

## **CAMEL**

Size: 3-4 feet, 50-100 pounds

Fossils found: Skeletons

Age of find: 23 million years old

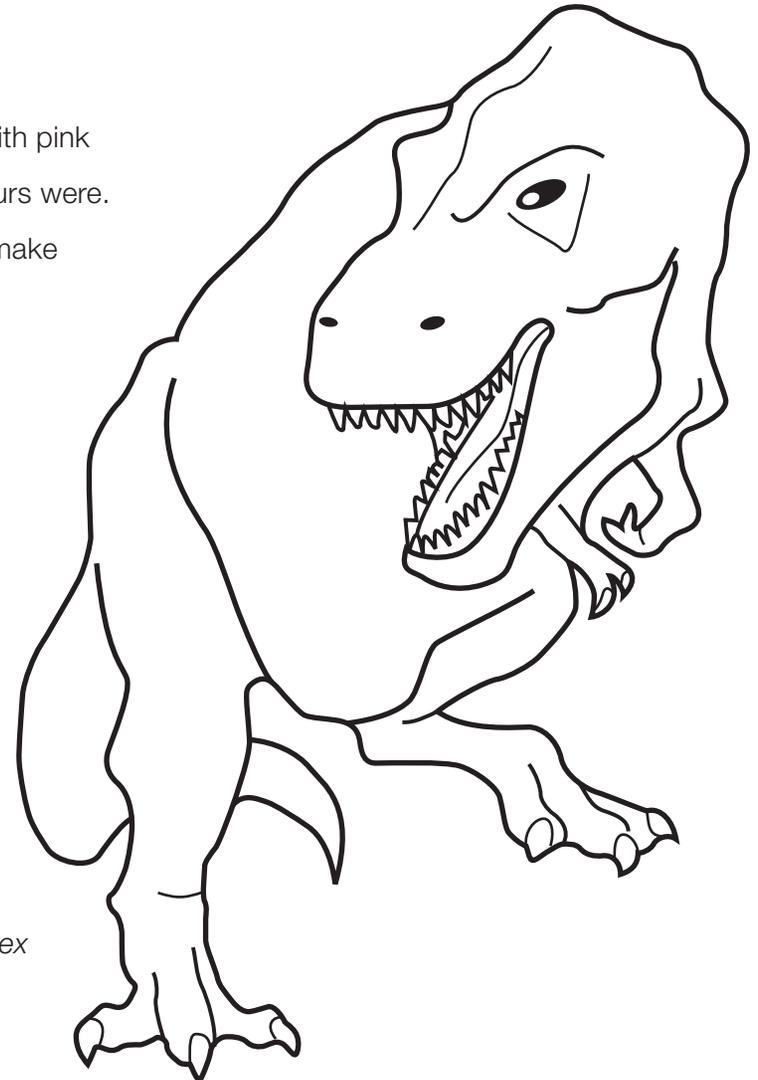


# Anatomy: The Key to Identifying how Fossils Lived?

Paleontologists use anatomy, the study of how bones, muscles and organs function, to learn about ancient life. Using a skeleton, paleontologists identify muscle scars (bumps on the bone that indicate where muscles attached to the bone). Paleontologists can then reconstruct how the muscles fit on an animal. From there, it is very easy to put skin onto the animal and tell what the animal looked like.

Some things are more difficult to tell. For example, you could draw a dinosaur with pink spots and no one could say you were wrong. We don't know what color dinosaurs were. Paleontologists use modern animals (like birds, elephants and rhinoceroses) to make guesses about the possible color of these large prehistoric beasts.

Paleontologists also use their knowledge of anatomy to develop ideas about the behavior of animals. For example, we can look at the large, pointed teeth of a *Tyrannosaurus rex* and conclude that the dinosaur ate meat.

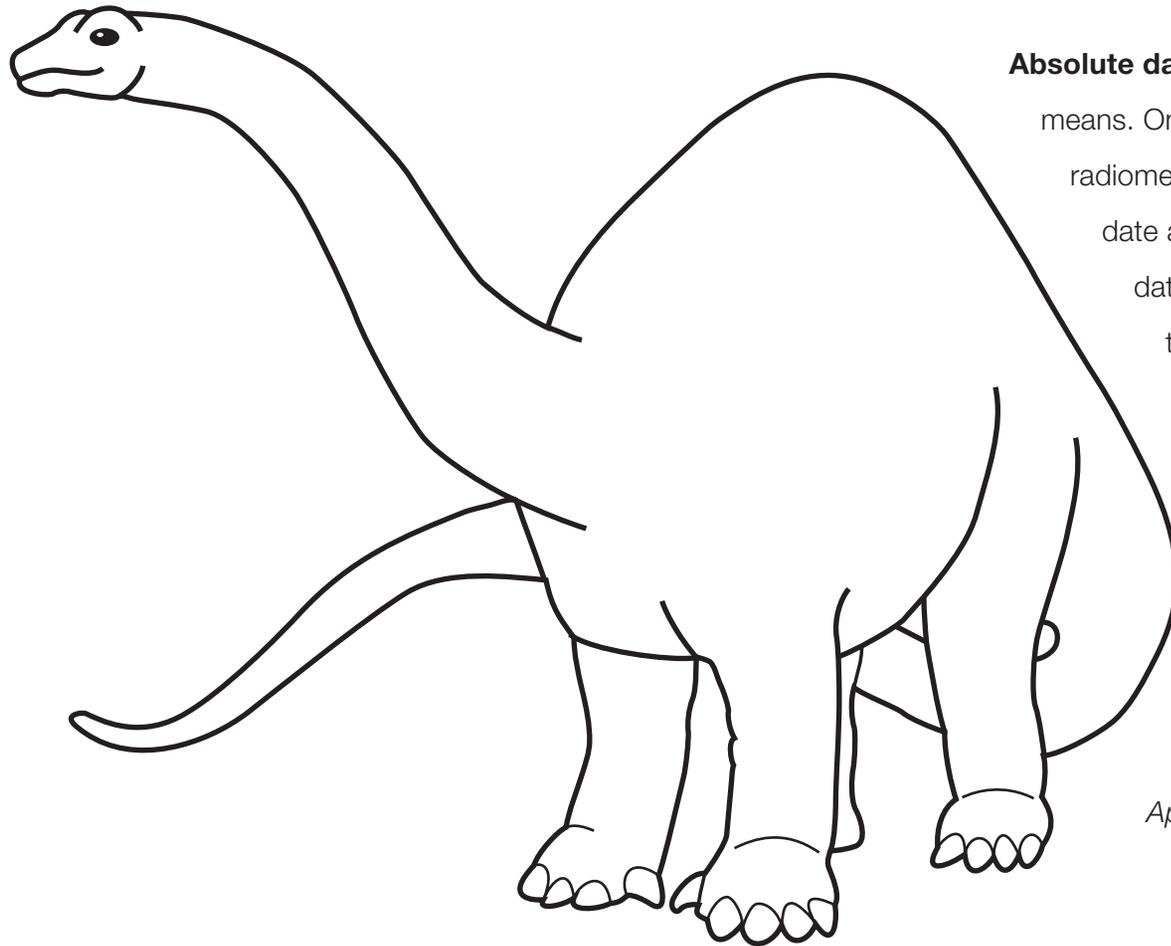


*Tyrannosaurus rex*

# How are Fossils Dated?

There are two types of dating methods used, **relative dating** and **absolute dating**.

**Relative dating** is more general. It is based on the relationships fossils have with each other. We know that a fossil found in one rock layer is older than a fossil found in a layer above it and that unique groups of fossils occur only in a specific layer of rock and nowhere else. These fossils are known as index fossils.



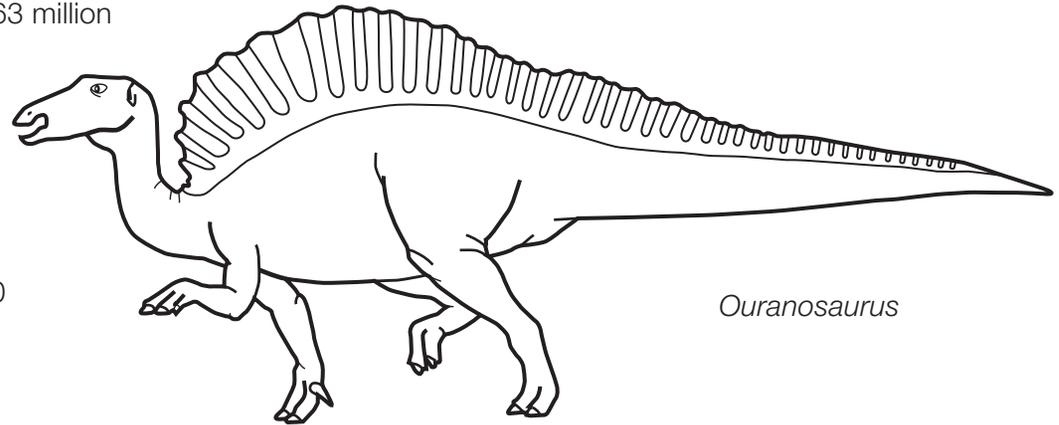
**Absolute dating** is an exact date obtained by several means. One of the most common of these means is radiometric dating, which uses physics and math to date a fossil. The most famous of the radiometric dating techniques is Carbon-14. Other dating techniques include “dendrochronology,” which determines how old a tree is by counting the rings that form in its trunk.

*Apatosaurus*

# How Much is a Million?

One million is a huge number. But a million is small when we talk about the history of the earth. Dinosaurs lived more than 63 million years ago. So how can we understand how much a million is?

Imagine a stack of paper. How tall would a stack of paper be if it contained one million sheets? Well a stack of 1,000 pages is about 4 inches high.



So lets do the math -----> a)  $1,000,000 \div 1,000 =$  \_\_\_\_\_

This is the number of 1,000 page piles you would need for 1,000,000 sheets.

b) the answer from question (a) x 4 (inches) = \_\_\_\_\_

This is the number of inches high our pile would be.

c) the answer from question (b)  $\div 12$  (inches in a foot) = \_\_\_\_\_ feet

This is the height of our 1,000,000 page pile, in feet.

A football field is 300 feet long. So, you can see that a pile of 1,000,000 pages of paper would be longer than a football field.

# What Happened to Dinosaurs?

Dinosaurs became extinct, or died out, as a result of natural selection. Species go extinct when they are unable to adapt to changes in the environment or compete effectively with other organisms. Well over 99% of the species that have ever lived have gone extinct.

Dinosaurs and other large reptiles became extinct during the Cretaceous period. The end of the last Ice Age also resulted in the extinction of many large mammals.

**WHY?** Climatic changes are believed to cause some mass extinctions. For the most recent extinctions, some scientists believe humans may have caused the loss during the late Pleistocene. Of course, humans have wiped out entire species (such as the passenger pigeon and dodo) in historic times.

